



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/790,816	03/03/2004	Terry L. Gilton	M4065.0607/P607-A	1483
24998	7590	04/11/2006	EXAMINER	
DICKSTEIN SHAPIRO MORIN & OSHINSKY LLP			DOTY, HEATHER ANNE	
2101 L Street, NW			ART UNIT	
Washington, DC 20037			PAPER NUMBER	
			2813	
DATE MAILED: 04/11/2006				

Please find below and/or attached an Office communication concerning this application or proceeding.

EF

Office Action Summary	Application No. 10/790,816	Applicant(s) GILTON, TERRY L.	
	Examiner Heather A. Doty	Art Unit 2813	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 January 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 27-32, 49 and 50 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 27-32, 49 and 50 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless – (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 27, 49, and 50 are rejected under 35 U.S.C. 102(e) as being anticipated by Kozicki (U.S. 2003/0035315).

Regarding claim 27, Kozicki teaches an array of resistance-variable memory cells in an integrated circuit (paragraph 0075; Figs. 4, 29), at least one memory cell comprising a pillar of stacked material layers on a semiconductor substrate (paragraph 0082), the stacked layers comprising a first electrode layer (**430** in Fig. 4; **2938** in Fig. 29), a chalcogenide glass layer having metal ions diffused therein and being capable of changing resistance under the influence of an applied voltage (**440** in Fig. 4, unlabeled in Fig. 29; paragraphs 0058-0059), and a second electrode layer (**420** in Fig. 4; **2930** in Fig. 29), each layer having a lateral edge approximately aligned with a lateral edge of each other layer (Fig. 29).

Regarding claim 49, Kozicki teaches the array of claim 27, and further teaches that the metal ions comprise silver ions (paragraph 0059).

Regarding claim 50, Kozicki teaches the array of claim 27, and further teaches that one of the first and second electrodes is tungsten (paragraph 0056).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 28-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kozicki (U.S. 2003/0035315) in view of Wolstenholme et al. (U.S. 5,751,012).

Regarding claims 28-30, Kozicki teaches the array of claim 27 (note 35 U.S.C. 102(e) rejection above), but does not teach insulating material in the regions between the pillars, that the insulating material comprises silicon oxide, or that the silicon oxide comprise TEOS.

Wolstenholme et al. teaches an array of pillar-shaped memory cells, wherein the regions between the pillars comprise insulating material, further limited by claim 28, which comprises silicon oxide, further limited by claim 29, which comprises TEOS, further limited by claim 30 (**34** in Fig. 3; column 6, lines 10-12). This nonconductive material is used to fill in the spaces between pillars (column 6, lines 10-12).

Therefore, at the time of the invention, it would have been obvious to one of ordinary skill in the art to make the array taught by Kozicki, and further form TEOS in the regions between the pillars, to fill in the space between the pillars with nonconductive material, since Wolstenholme et al. teaches that TEOS is an appropriate material to use for such a purpose.

Claims 31 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kozicki (U.S. 2003/0035315) in view of Wolstenholme et al. (U.S. 5,751,012), as applied to claim 29 above, and further in view of Shroff et al. (U.S. 6,515,343).

Regarding claims 31 and 32, Kozicki and Wolstenholme et al. together teach the array of claim 29 (note 35 U.S.C. 103(a) rejection above). They do not teach that the insulting material further comprises a silicon nitride layer below the silicon oxide that conforms to the pillars and to the substrate, or that the silicon nitride layer is between 5 nm and 50 nm thick.

Shroff et al. teaches an array of antifuse pillars (**101**, **104**, and **106** in Fig. 3), wherein the regions between the pillars comprise insulating material (**110** in Fig. 3), and a silicon nitride layer that conforms to the pillars and to the region beneath the insulating material (**120** in Fig. 3). The silicon nitride layer protects the impurities from diffusing into the programmable layers (column 4, lines 35-56).

Shroff et al. teaches that the silicon nitride layer is "relatively thin" (column 4, lines 46-48), but does not expressly teach that it is between 5 and 50 nm thick. However, it has been held that "where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller* 105 USPQ233, 255 (CCPA 1955).

Therefore, at the time of the invention, it would have been obvious to one of ordinary skill in the art to form the layer of silicon nitride taught by Kozicki and Wolstenholme et al. together so that it conforms to the pillars and the substrate beneath the insulting material, as taught by Shroff et al. The motivation for doing so at the time

of the invention would have been to get better sidewall coverage for the pillars, and better protect them from impurities, as taught by Shroff et al. It additionally would have been obvious to one of ordinary skill in the art to optimize the thickness of the silicon nitride layer to arrive at the claimed thickness of between 5 nm and 50 nm.

Response to Arguments

Applicant's arguments with respect to claims 27-32 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.


Art Unit: 2813

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Heather A. Doty, whose telephone number is 571-272-8429. The examiner can normally be reached on M-F, 8:30 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, Jr., can be reached at 571-272-1702. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

had


CARL WHITEHEAD, JR.
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800